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Rapid climate response to the Lower Cretaceous Oceanic Anoxic Event 1b

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The OAE 1b in the Lower Cretaceous is one of the major perturbations of the global carbon cycle. It is documented in Albian deposits from the North and Central Atlantic regions as well as in regions of the Western Tethys. High-resolution geochemical profiles from two locations (Mazagan Plateau DSDP Site 545 and the Vocontian Basin) show, that the perturbation of the carbon cycle occurred synchronously in the oceanic- and atmospheric carbon reservoirs. This is indicated by the stable isotopic composition of biomarkers for terrestrial higher plant waxes and marine algal lipids. The climate system in the tropics responded with a rapid rise in sea surface temperature (SST), up to 3 °C, which is documented by TEX 86 derived proxy data. For both investigated sites, climate proxies based on Al-normalized element ratios indicate a shift towards more humid climate conditions. The effects of this major perturbation of the climate had also consequences for the biota at the two investigated locations. At the Mazagan Plateau the organic matter production increased even though the upwelling, which had prevailed for more than 200 ka prior to the event, weakened probably due to an increased influx of nutrients from the adjacent African Continent. The bioproduction of the Vocontian Basin shifted towards bacterial dominated communities as indicated by selected isoprenoids (e.g., PME). Our data show, that these major perturbations of the carbon cycle had complex effects in different regions of the Lower Albian tropics.